Amendments to the Claims

Please amend the claims as follows:

1. (currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a dielectric layer to a silicon-containing gas under low partial pressure to deposit a continuous layer of silicon thereon; and

exposing the silicon layer to a nitrogen-containing gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms.

2. (previously presented) The method of Claim 1, wherein the dielectric layer is exposed to the silicon-containing gas at a partial pressure of about 10^{-2} Torr or less.

3. (previously presented) The method of Claim 1, wherein the dielectric layer is exposed to the silicon-containing gas at pressure of about 10^{-2} to about 10^{-7} Torr.

4. (previously presented) The method of Claim 2, wherein the dielectric layer is exposed to the silicon-containing gas at a temperature of about 500°C to about 700°C.

5. (currently amended) A method of forming a nitride barrier layer, comprising the steps of:

irradiating a dielectric layer with a silicon-containing gas under low partial pressure to nucleate the dielectric layer with a uniform layer of silicon; and

exposing the silicon layer to a nitrogen-containing gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms.

6. (currently amended) The method of Claim 5, wherein the combined thickness of the silicon layer and the silicon nitride layer is ~~has a thickness of~~ about 10 to about ~~30~~ 20 angstroms.

7. (currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a dielectric layer to a silicon-containing gas under low partial pressure to deposit a continuous layer of about 10 to about 30 angstroms silicon thereon; and

nitridizing the silicon layer in a nitrogen-containing gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms.

8. (currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a surface of a dielectric layer to a silicon-containing gas at a low partial pressure to nucleate the surface of the dielectric layer with a continuous layer of silicon; and

exposing the silicon layer to a nitrogen-containing gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms.

9. (currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a dielectric layer to a silicon-containing gas at a partial pressure of about 10^{-2} Torr or less to deposit a continuous layer of about 10 to about 30 angstroms silicon thereon; and

nitridizing the silicon layer to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms.

10. (previously presented) The method of Claim 9, wherein the dielectric layer is exposed to the silicon-containing gas at a temperature of about 500°C to about 700°C.

11. (previously presented) The method of Claim 9, wherein the silicon-containing gas is selected from the group consisting of dichlorosilane, silicon tetrachloride, silane, and disilane.

12. (previously presented) The method of Claim 9, wherein the step of exposing the dielectric layer to the silicon-containing gas is by plasma enhanced chemical vapor deposition, low pressure chemical vapor deposition, or rapid thermal chemical vapor deposition.

13. (previously presented) The method of Claim 9, wherein the silicon-containing gas is deposited by rapid thermal chemical vapor deposition at about 500°C. to about 700°C.

14. (original) The method of Claim 9, wherein the dielectric layer comprises silicon dioxide.

15. (withdrawn) The method of Claim 9, wherein the dielectric layer comprises a dielectric material selected from the group consisting of tantalum pentoxide, hafnium dioxide, and aluminum trioxide.

16. (currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a dielectric layer to a silicon-containing gas at a partial pressure of about 10^{-2} to about 10^{-7} Torr to nucleate the dielectric layer with a continuous layer of silicon; and

exposing the silicon layer to a nitrogen-containing gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms.

17. (currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a dielectric layer to a silicon-containing gas at a partial pressure of about 10^{-2} to about 10^{-7} Torr, a temperature of about 500°C. to about 700°C., and a duration of about 1 second to about 5 minutes, to nucleate the dielectric layer with a continuous layer of silicon; and

exposing the silicon layer to a nitrogen-containing gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms.

18. (currently amended) A method of forming a nitride barrier layer, comprising the steps of:

depositing a continuous silicon layer onto a dielectric layer by exposing the dielectric layer to a silicon-containing gas under low partial pressure; and

thermally annealing the silicon layer in a nitrogen-containing gas to form the nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms.

19. (currently amended) A method of forming a nitride barrier layer, comprising the steps of:

depositing a continuous silicon layer onto a dielectric layer by exposing the dielectric layer to a silicon-containing gas under low partial pressure; and

exposing the silicon layer to a nitrogen-containing gas at a temperature of about 700°C. to about 900°C. to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

20. (currently amended) A method of forming a nitride barrier layer, comprising the steps of:

depositing a continuous silicon layer onto a dielectric layer by exposing the dielectric layer to a silicon-containing gas under low partial pressure; and

exposing the silicon layer to a nitrogen-containing gas at a temperature of about 700°C. to about 900°C., a pressure of about 1 to about 760 Torr, and a flow rate of about 100 to about 10,000 sccm, for about 1 second to about 180 minutes to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

21. (previously presented) The method of Claim 20, wherein the nitrogen-containing gas is selected from the group consisting of nitrogen, ammonia, nitrogen trifluoride, nitrogen oxide, and a nitrogen-helium mixture.

22. (withdrawn) The method of Claim 21, wherein the silicon layer is exposed to a plasma source of nitrogen.

23. (withdrawn- currently amended) A method of forming a nitride barrier layer, comprising the steps of:

depositing a uniform silicon layer onto a dielectric layer by exposing the dielectric layer to a silicon-containing gas under low partial pressure; and

exposing the silicon layer to a plasma source of a nitrogen-containing gas to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

24. (withdrawn) The method of Claim 23, wherein the plasma source of the nitrogen-containing gas is produced by a downstream microwave system, an electron cyclotron residence system, an inductive coupled plasma system, or a radio frequency system.

25. (withdrawn-currently amended) A method of forming a nitride barrier layer, comprising the steps of:

depositing a uniform silicon layer onto a dielectric layer by exposing the dielectric layer to a silicon-containing gas under low partial pressure; and

exposing the silicon layer to a remote microwave plasma source of a nitrogen-containing gas at a pressure of about 1 to about 20 Torr to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

26. (withdrawn-currently amended) A method of forming a nitride barrier layer, comprising the steps of:

depositing a uniform silicon layer onto a dielectric layer by exposing the dielectric layer to a silicon-containing gas under low partial pressure; and

exposing the silicon layer to a remote microwave plasma source of a nitrogen-containing gas at a pressure of about 1 to about 20 Torr, and a temperature of about 700°C. to about 900°C. to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

27. (withdrawn-currently amended) A method of forming a nitride barrier layer, comprising the steps of:

depositing a continuous silicon layer onto a dielectric layer by exposing the dielectric layer to a silicon-containing gas under low partial pressure; and

exposing the silicon layer to an inductive coupled plasma source of a nitrogen-containing gas at a pressure of about 1 to about 20 Torr to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

28. (withdrawn-currently amended) A method of forming a semiconductor device, comprising the steps of:

irradiating a dielectric layer situated on a silicon substrate with a silicon-containing gas under low partial pressure to nucleate the dielectric layer with a continuous layer of silicon; and

nitridizing the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

29. (withdrawn) The method of Claim 28, wherein the step of irradiating the dielectric layer with the silicon-containing gas is at a partial pressure about 10^{-2} Torr or less.

30. (withdrawn) The method of Claim 29, wherein the step of irradiating the dielectric layer is at a partial pressure of about 10^{-2} to about 10^{-7} Torr.

31. (withdrawn) The method of Claim 29, wherein the silicon-containing gas is selected from the group consisting of dichlorosilane, silicon tetrachloride, silane, and disilane.

32. (withdrawn) The method of Claim 28, wherein the step of irradiating the dielectric layer with the silicon-containing gas is by plasma enhanced chemical vapor deposition, low pressure chemical vapor deposition, or rapid thermal chemical vapor deposition.

33. (withdrawn) The method of Claim 28, wherein the step of irradiating the dielectric layer with the silicon-containing gas is by rapid thermal chemical vapor deposition at a temperature of about 500°C to about 700°C.

34. (withdrawn) The method of Claim 28, wherein the dielectric layer comprises silicon dioxide.

35. (withdrawn) The method of Claim 28, wherein the dielectric layer comprises a dielectric material selected from the group consisting of tantalum pentoxide, hafnium dioxide, and aluminum trioxide.

36. (withdrawn-currently amended) A method of forming a semiconductor device, comprising the steps of:

exposing a dielectric layer situated on a silicon substrate to a silicon-containing gas at a partial pressure of about 10^{-2} Torr or less to nucleate the dielectric layer with a continuous layer of silicon; and

nitridizing the silicon layer in a nitrogen-containing gas; the nitridized silicon layer having a thickness of about 10-30 angstroms.

37. (withdrawn-currently amended) A method of forming a semiconductor device, comprising the steps of:

exposing an oxide layer situated on a silicon substrate to a silicon-containing gas at a partial pressure of about 10^{-2} Torr or less to nucleate the dielectric layer with a continuous layer of silicon; and

thermally annealing the silicon layer in a nitrogen-containing gas; the annealed silicon layer having a thickness of about 10-30 angstroms.

38. (withdrawn-currently amended) A method of forming a semiconductor device, comprising the steps of:

exposing an oxide layer situated on a silicon substrate to a silicon-containing gas at a partial pressure of about 10^{-2} Torr or less to nucleate the dielectric layer with a continuous layer of silicon; and

exposing the silicon layer to a nitrogen-containing gas at a temperature of about 700°C. to about 900°C. to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

39. (withdrawn-currently amended) A method of forming a semiconductor device, comprising the steps of:

depositing a silicon layer onto a dielectric layer by exposing the dielectric layer to a silicon-containing gas under low partial pressure to nucleate the dielectric layer with a continuous layer of silicon; and

exposing the silicon layer to a plasma source of a nitrogen-containing gas to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

40. (withdrawn) The method of Claim 39, wherein the plasma source of the nitrogen-containing gas is produced by a downstream microwave system, an electron cyclotron residence system, an inductive coupled plasma system, or a radio frequency system.

41. (withdrawn-currently amended) A method of forming a semiconductor device, comprising the steps of:

depositing a silicon layer onto a dielectric layer by exposing the dielectric layer to a silicon-containing gas under low a partial pressure of about 10^{-2} Torr or less to nucleate the dielectric layer with a continuous layer of silicon; and

exposing the silicon layer to a remote microwave plasma source of a nitrogen-containing gas at a pressure of about 1 to about 20 Torr to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

42. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

exposing a gate oxide layer situated on a silicon substrate to a silicon-containing gas at a partial pressure of about 10^{-2} Torr or less to nucleate the dielectric layer with a continuous layer silicon; and

exposing the silicon layer to a nitrogen-containing gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride barrier layer having a combined thickness of about 10-30 angstroms.

43. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

exposing a gate oxide layer situated on a silicon substrate to a silicon-containing gas at a partial pressure of about 10^{-2} to about 10^{-7} Torr to nucleate the dielectric layer with a continuous layer of silicon; and

exposing the silicon layer to a nitrogen-containing gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride barrier layer having a combined thickness of about 10-30 angstroms.

44. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

exposing a gate oxide layer situated on a silicon substrate to a silicon-containing gas at a partial pressure of about 10^{-2} to about 10^{-7} Torr, a temperature of about 500°C. to about 700°C., and a duration of about 1 second to about 5 minutes, to nucleate the dielectric layer with a continuous layer of silicon and

exposing the silicon layer to a nitrogen-containing gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride barrier layer having a combined thickness of about 10-30 angstroms.

45. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

depositing a continuous silicon layer onto a gate oxide layer situated on a silicon substrate by exposing the gate oxide layer to a silicon-containing gas at a partial pressure of about 10^{-2} Torr or less; and

thermally annealing the silicon layer in a nitrogen-containing gas; the thermally annealed silicon layer having a thickness of about 10-30 angstroms.

46. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

depositing a continuous silicon layer onto a gate oxide layer situated on a silicon substrate by exposing the gate oxide layer to a silicon-containing gas at a partial pressure of about 10^{-2} Torr or less; and

exposing the silicon layer to a nitrogen-containing gas at a temperature of about 700°C. to about 900°C. to nitridize the silicon layer to a silicon nitride layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms.

47. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

depositing a continuous silicon layer onto a gate oxide layer situated on a silicon substrate by exposing the dielectric layer to a silicon-containing gas under low partial pressure; and

exposing the silicon layer to a nitrogen-containing gas at a temperature of about 700°C. to about 900°C., a pressure of about 1 to about 760 Torr, a flow rate of about 100 to about 10,000 sccm, for about 1 second to about 180 minutes to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

48. (withdrawn) The method of Claim 47, wherein the nitrogen-containing gas is selected from the group consisting of nitrogen, ammonia, nitrogen trifluoride, nitrogen oxide, and a mixture of nitrogen and helium.

49. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

depositing a continuous silicon layer onto a gate oxide layer situated on a silicon substrate by exposing the dielectric layer to a silicon-containing gas at a partial pressure of about 10^{-2} Torr or less; and

exposing the silicon layer to a plasma source of a nitrogen-containing gas to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

50. (withdrawn) The method of Claim 49, wherein the plasma source of the nitrogen-containing gas is produced by a downstream microwave system, an electron cyclotron residence system, an inductive coupled plasma system, or a radio frequency system.

51. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

depositing a continuous silicon layer onto a gate oxide layer situated on a silicon substrate by exposing the dielectric layer to a silicon-containing gas at a partial pressure of about 10^{-2} Torr or less; and

exposing the silicon layer to a remote microwave plasma source of a nitrogen-containing gas at a temperature of about 700°C. to about 900°C., and a pressure of about 1 to about 20 Torr to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

52. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

depositing a continuous silicon layer onto a gate oxide layer situated on a silicon substrate by exposing the dielectric layer to a silicon-containing gas at a partial pressure of about 10^{-2} Torr or less; and

exposing the silicon layer to an inductive coupled plasma source of a nitrogen-containing gas at a pressure of about 1 to about 20 Torr to nitridize the silicon layer; the nitridized silicon layer having a thickness of about 10-30 angstroms.

53. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

exposing a gate oxide layer situated on a silicon substrate to a silicon-containing gas at a partial pressure of about 10^{-2} to about 10^{-7} Torr to nucleate the dielectric layer with a continuous layer of silicon;

nitridizing the silicon layer in a nitrogen-containing gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms; and

forming a conductive polysilicon layer comprising a conductivity enhancing dopant over the nitride barrier layer; wherein the nitride barrier layer inhibits passage of the dopant from the conductive polysilicon layer therethrough.

54. (withdrawn) The method of Claim 53, wherein the polysilicon layer comprises a boron dopant.

55. (withdrawn) The method of Claim 53, further comprising:
forming an insulative nitride cap over the conductive polysilicon layer; and
patterning the layers to form a gate stack.

56. (withdrawn) The method of Claim 53, further comprising:
forming a barrier layer over the doped polysilicon layer;
forming a conductive metal layer over the barrier layer;
forming an insulative nitride cap over the conductive metal layer; and
patterning the layers to form a gate stack.

57. (withdrawn) The method of Claim 53, further comprising:
forming a metal silicide layer over the doped polysilicon layer;
forming an insulative nitride cap over the metal silicide layer; and
patterning the layers to form a gate stack.

58-72. (canceled)

73. (withdrawn-currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a dielectric layer to a silicon gas under low partial pressure to nucleate the dielectric layer with a continuous layer of silicon; and

exposing the silicon layer on the dielectric layer to a nitrogen gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms.

74. (withdrawn) The method of Claim 73, wherein the silicon on the dielectric layer has a thickness of up to about 30 angstroms.

75. (withdrawn-currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a dielectric layer to a silicon gas under a low partial pressure of about 10^{-2} Torr or less to nucleate the dielectric layer with a continuous layer of silicon; and

exposing the silicon layer on the dielectric layer to a nitrogen gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms.

76. (withdrawn-currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a dielectric layer to a silicon gas by chemical vapor deposition under a low partial pressure of about 10^{-2} Torr or less to nucleate the dielectric layer with a continuous layer of silicon; and

exposing the silicon layer on the dielectric layer to a nitrogen gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of about 10-30 angstroms.

77. (withdrawn) The method of Claim 76, wherein the step of exposing the dielectric layer to the silicon gas comprises rapid thermal chemical vapor deposition conducted at about 500°C. to about 700°C. and a partial pressure of about 10^{-2} Torr or less.

78. (withdrawn) The method of Claim 76, wherein the step of exposing the dielectric layer to the silicon gas comprises plasma enhanced chemical vapor deposition.

79. (withdrawn) The method of Claim 76, wherein the step of exposing the dielectric layer to the silicon gas comprises low pressure chemical vapor deposition.

80. (withdrawn-currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a dielectric layer to a silicon gas under low partial pressure of about 10^{-2} Torr or less to deposit a continuous layer of silicon thereon to a thickness of up to about 30 angstroms; and

exposing the silicon layer on the dielectric layer to a nitrogen gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of up to about 30 angstroms.

81. (withdrawn-currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a dielectric layer to a silicon gas to nucleate the dielectric layer with a continuous layer of silicon; and

thermally annealing the silicon layer on the dielectric layer in a nitrogen gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of up to about 30 angstroms.

82. (withdrawn-currently amended) The method of Claim 81, wherein the silicon on the dielectric layer has a thickness of ~~up to~~ about 10-30 angstroms.

83. (withdrawn-currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a dielectric layer to a silicon gas under low partial pressure of about 10^{-2} or less to deposit a continuous layer of silicon thereon to a thickness of up to about 30 angstroms; and

thermally annealing the silicon layer on the dielectric layer in a nitrogen gas to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of up to about 30 angstroms.

84. (withdrawn) The method of Claim 83, wherein the step of thermally annealing is conducted at temperature of about 700°C. to about 900°C.

85. (withdrawn-currently amended) A method of forming a nitride barrier layer, comprising the steps of:

exposing a dielectric layer to a silicon gas under low partial pressure of about 10^{-2} Torr or less to deposit a continuous layer of silicon thereon to a thickness of up to about 30 angstroms; and

nitridizing the silicon layer on the dielectric layer with a plasma source of nitrogen to form a silicon nitride barrier layer; the silicon layer and silicon nitride layer having a combined thickness of up to about 30 angstroms.

86. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

exposing a gate oxide layer to a silicon gas under low partial pressure to nucleate the gate oxide layer with a continuous silicon layer; and

exposing the silicon layer on the gate oxide layer to a nitrogen gas to form a silicon nitride barrier layer over the gate oxide layer; the silicon layer and silicon nitride layer having a combined thickness of up to about 30 angstroms.

87. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

exposing a gate oxide layer to a silicon gas by chemical vapor deposition under a low partial pressure of about 10^{-2} Torr or less to nucleate the gate oxide layer with a continuous silicon layer; and

exposing the silicon layer on the gate oxide layer to a nitrogen gas to form a silicon nitride barrier layer over the gate oxide layer; the silicon layer and silicon nitride layer having a combined thickness of up to about 30 angstroms.

88. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

exposing a gate oxide layer to a silicon gas under low partial pressure of about 10^{-2} Torr or less to deposit a continuous layer of silicon thereon to a thickness of up to about 30 angstroms; and

exposing the silicon layer on the gate oxide layer to a nitrogen gas to form a silicon nitride barrier layer over the gate oxide layer; the silicon layer and silicon nitride layer having a combined thickness of up to about 30 angstroms.

89. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

exposing a gate oxide layer to a silicon gas to nucleate the gate oxide layer with a continuous layer of silicon; and

thermally annealing the silicon layer on the gate oxide layer in a nitrogen gas to form a silicon nitride barrier layer over the gate oxide layer; the silicon layer and silicon nitride layer having a combined thickness of up to about 30 angstroms.

90. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

exposing a gate oxide layer to a silicon gas under low partial pressure of about 10^{-2} Torr or less to deposit a continuous layer of silicon thereon to a thickness of up to about 30 angstroms; and

thermally annealing the silicon layer on the gate oxide layer in a nitrogen gas to form a silicon nitride barrier layer over the gate oxide layer; the silicon layer and silicon nitride layer having a combined thickness of up to about 30 angstroms.

91. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

exposing a gate oxide layer to a silicon gas under low partial pressure of about 10^{-2} Torr or less to deposit a continuous layer of silicon thereon to a thickness of up to about 30 angstroms; and

nitridizing the silicon layer on the gate oxide layer with a plasma source of nitrogen to form a silicon nitride barrier layer over the gate oxide layer; the silicon layer and silicon nitride layer having a combined thickness of up to about 30 angstroms.

92. (withdrawn-currently amended) A method of forming a gate electrode, comprising the steps of:

exposing a gate oxide layer to a silicon gas under low partial pressure of about 10^{-2} Torr or less to nucleate the gate oxide layer with a continuous layer of silicon to a thickness of up to about 30 angstroms;

exposing the silicon layer on the gate oxide layer to a nitrogen gas to form a silicon nitride barrier layer over the gate oxide layer; the silicon layer and silicon nitride layer having a combined thickness of up to about 30 angstroms; and

forming a conductive layer over the silicon nitride barrier layer.

93. (withdrawn) The method of Claim 92, further comprising the steps of forming an insulative nitride layer over the conductive layer; and patterning the layers to form a gate stack.

94. (withdrawn) The method of Claim 92, wherein the conductive layer comprises polysilicon comprising a conductivity enhancing dopant, and the nitride barrier layer inhibits passage of the dopant from the conductive polysilicon layer through the barrier layer.

95. (withdrawn) The method of Claim 94, further comprising:
forming a barrier layer over the doped polysilicon layer;
forming a conductive metal layer over the barrier layer;
forming an insulative nitride layer over the conductive metal layer; and
patterning the layers to form a gate stack.

96. (withdrawn) The method of Claim 94, further comprising:
forming a metal silicide layer over the doped polysilicon layer;
forming an insulative nitride cap over the metal silicide layer; and
patterning the layers to form a gate stack.

97. (currently amended) The method of Claim 1, wherein the silicon layer on the dielectric layer has a thickness of up to about 30 angstroms.

98. (previously presented) The method of Claim 1, wherein the silicon-containing gas is selected from the group consisting of dichlorosilane, silicon tetrachloride, silane, and disilane.

99. (previously presented) The method of Claim 1, wherein the step of exposing the dielectric layer to the silicon gas comprises chemical vapor deposition of the silicon gas.

100. (previously presented) The method of Claim 1, wherein the step of exposing the dielectric layer to the silicon gas comprises rapid thermal chemical vapor deposition of the silicon gas.

101. (withdrawn) The method of Claim 1, wherein the step of exposing the dielectric layer to the silicon gas comprises plasma enhanced chemical vapor deposition of the silicon gas.

102. (withdrawn) The method of Claim 101, wherein the step of exposing the dielectric layer to the silicon gas comprises low-pressure chemical vapor deposition of the silicon gas.

103. (previously presented) The method of Claim 1, wherein the step of exposing the silicon layer comprises thermally annealing the silicon layer in a nitrogen-containing gas.

104. (previously presented) The method of Claim 1, wherein the step of exposing the silicon layer comprises a temperature of about 700°C. to about 900°C.

105. (previously presented) The method of Claim 1, wherein the step of exposing the silicon layer comprises a temperature of about 700°C. to about 900°C., a pressure of about 1 to about 760 Torr, and a flow rate of about 100 to about 10,000 sccm for about 1 second to about 180 minutes.

106. (previously presented) The method of Claim 1, wherein the nitrogen-containing gas is selected from the group consisting of nitrogen, ammonia, nitrogen trifluoride, nitrogen oxide, and a nitrogen-helium mixture.

107. (withdrawn) The method of Claim 1, wherein the nitrogen-containing gas comprises a plasma source of nitrogen.

108. (withdrawn) The method of Claim 107, wherein the plasma source of the nitrogen is produced by a downstream microwave system, an electron cyclotron residence system, an inductive coupled plasma system, or a radio frequency system.

109. (withdrawn) The method of Claim 1, wherein the step of exposing the silicon layer comprises a remote microwave plasma source of nitrogen.

110. (withdrawn) The method of Claim 109, wherein the step of exposing the silicon layer comprises a pressure of about 1 to about 20 Torr, and a temperature of about 700°C. to about 900°C.

111. (withdrawn) The method of Claim 1, wherein the step of exposing the silicon layer comprises an inductive coupled plasma source of nitrogen.

112. (previously presented) The method of Claim 1, wherein the step of exposing the dielectric layer comprises a partial pressure of about 10^{-2} to about 10^{-7} Torr, a temperature of about 500°C. to about 700°C., and a duration of about 1 second to about 5 minutes.

113. (withdrawn) The method of Claim 1, wherein the dielectric layer comprises a gate oxide layer.

114. (withdrawn) The method of Claim 1, further comprising: forming a conductive layer over the silicon nitride barrier layer.

115. (withdrawn) The method of Claim 114, wherein the conductive layer comprises a conductive polysilicon.

116. (withdrawn) The method of Claim 115, wherein the conductive polysilicon layer comprises a conductivity enhancing dopant, and the nitride barrier layer inhibits passage of the dopant from the conductive polysilicon layer therethrough.

117. (withdrawn) The method of Claim 116, wherein the polysilicon layer comprises a boron dopant.

118. (withdrawn) The method of Claim 114, further comprising: forming an insulative nitride cap over the conductive layer.

119. (withdrawn) The method of Claim 118, further comprising: patterning the layers to form a gate stack.

120. (withdrawn) The method of Claim 116, further comprising:
forming a barrier layer over the doped polysilicon layer;
forming a conductive metal layer over the barrier layer;
forming an insulative nitride cap over the conductive metal layer; and
patterning the layers to form a gate stack.

121. (withdrawn) The method of Claim 116, further comprising:
forming a metal silicide layer over the doped polysilicon layer;
forming an insulative nitride cap over the metal silicide layer; and
patterning the layers to form a gate stack.